



NYSERDA's

NGV Technology Program

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NGVTF Technical Committee Meeting

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NYSERDA

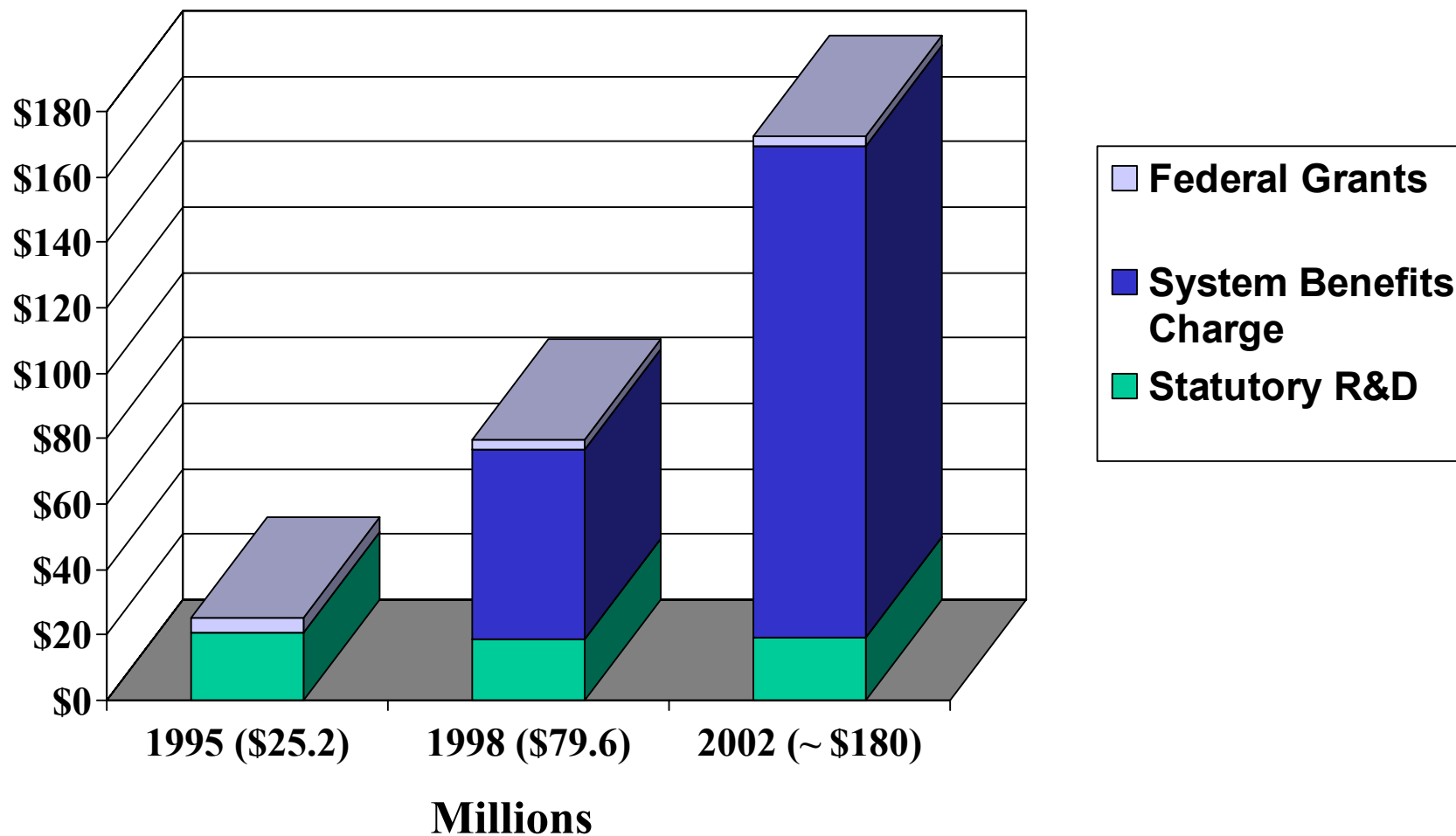
- Public benefit corporation created in 1975 in response to the energy crisis.
- Administrator of the PSC Systems Benefit Charge Program.
- Three primary NYS focus areas
energy - environment – economy.



Mission Statement

- Use innovation and technology to solve some of New York's most difficult energy and environmental problems in ways that improve the State's economy.

NYSERDA Funding



NYSERDA Transportation Program

- Research and Development
 - ⊕ Technology Advancement
 - * Light-Duty Vehicles
 - * Heavy-Duty Vehicles
 - * Infrastructure
 - * Institutional Impediments
- Energy Services
 - ⊕ AFV Deployment
 - * Clean Cities Coordination
 - * DOE SEP Grants
 - * State (Bond Act, NYSERDA) Grants

NYSERDA Light-Duty NGV Research (overview)

- 1990 - 1995
 - ⊗ AFV Fleet Demonstration Program
 - ⊗ 257 AFVs (Plus Infrastructure), 21 Fleets
 - ⊗ All Types of AFVs (half were CNG Light-Duty)
 - ⊗ 3 years data, 7.3 Million Miles, 1003 FTP tests
- 1995 - 1997
 - ⊗ CNG Taxi “Pilot Fleet”
 - ⊗ 18 NYC Cabs Converted to CNG & Tested
 - ⊗ Developed Specs for Clean Fuel Taxi Program
- 1997 - 1999
 - ⊗ CNG Gasoline Conversion Kit
 - ⊗ First and Only Kit to Pass Tests at EPA

NYSERDA Light-Duty NGV Research (overview cont'd)

- 1990 - 1999

- ⊗ CNG Compressor & Station Auxiliaries Programs
- ⊗ Aurora “Guided Rotor Compressor”
- ⊗ Strategies to Reduce Fill Time, Short Fills, etc.
- ⊗ Partners included Amoco, NYGAS, NiMo

- 2002

- ⊗ Extended Range CNG Taxi, Pickup Truck
- ⊗ NYSDOT Market Pull
- ⊗ NYC Taxi and Limousine Commission
- ⊗ AltFuels Initiative

NYSERDA Heavy-Duty NGV Research

- 1990 - 1994
 - ⊗ CNG Bus Users Group / FTA Clean Air Program
 - ⊗ 31 CNG Buses, 5 NY Transit Operators
 - ⊗ Orion V, Cummins L10 (Phase I engine)
- 1996 - 1999
 - ⊗ Cummins NG Engine Consortium
 - ⊗ Original Focus on L10 Improvements
 - ⊗ Technology Transferred to C8.3 and Others
- 2000 - 2003
 - ⊗ Dual Fuel (Diesel-CNG) Conversion Kit
 - w/ NYSEG and Save on Energy
 - ⊗ Now Supporting NYS Field Tests, Deployment

What Have We Learned ?

| Old Assumptions | New Realities |
|------------------------------------|---|
| NG is a Domestic Fuel | NG is a Global Commodity |
| NG is Abundant | NG is a Finite Resource |
| NG Reduces Pollution | Compared to What? |
| All Fleets will be Mandated | Apparently Not |
| Low NGV Efficiency is OK | Hurts GHG, Range, \$ |
| Dedicated NGVs Assure Max Benefits | Absent Mandates, Flexible Solutions are Needed |
| NGVs Pave Way for H2/FCVs | NGVs are Sobering Lesson for H2/FCV Enthusiasts |

What Is Needed ?

- Efficiency improvements
 - ⊗ fuel cost
 - ⊗ Greenhouse Gases
- Range improvements
(or Infrastructure)
- Competitive Cost
 - ⊗ Life Cycle Cost

NYSERDA R&D Program Elements

| | Efficiency | Range | Cost |
|---------|---------------------------------|------------------|---------------------------|
| Current | CI Cycle Dual Fuel | LNG Dual Fuel | State / Federal Grants |
| Future | Hydraulic Regen Miller Cycle | Infrastructure | Volume Production |



NYSERDA Dual Fuel Project



**Low Emissions Options for
Transportation Fleets**



**Dual Fuel Conversion Kits: CNG with
20% Diesel (for startup & backup)**

Medium, Heavy Duty Trucks

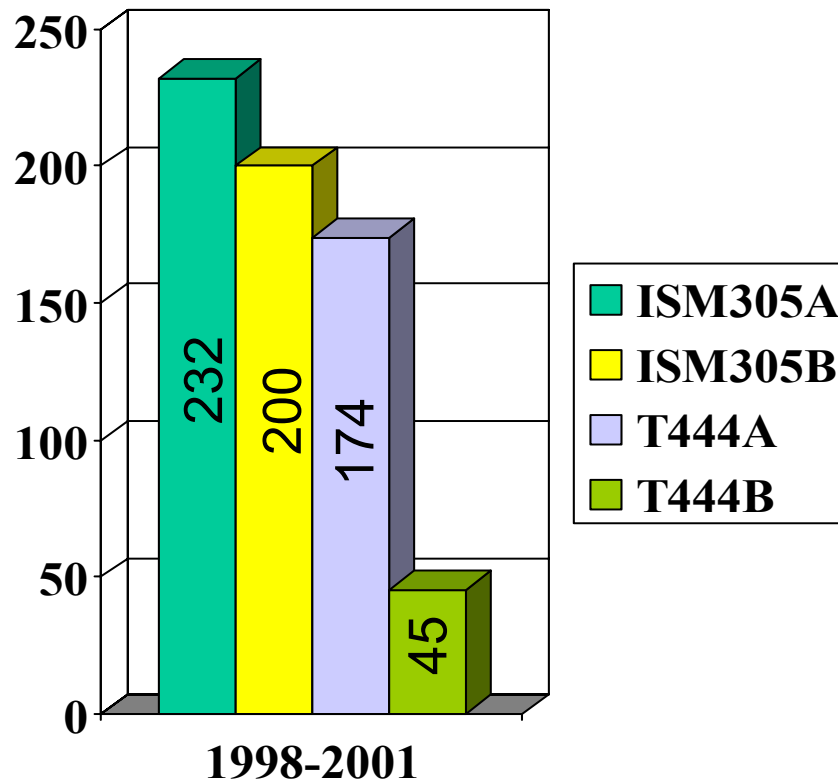
Dual Fuel Project Overview

- Funding \$700,500
- Participants: Bachman AFV, Baker Equipment
- Project Goals
 - ⊗ Complete development / certification of low-cost, high-performance dual fuel conversion kits for large NYS fleet.
 - ⊗ Establish NYS supplier of certified dual fuel products.

Dual Fuel Conversion Kit Project Scope

- Finalize vehicle list and fleet participation, and submit request for EPA Waiver.
- Complete emission and durability testing on Mack E7 (CARB Test Vehicle); achieve CARB System Verification Status and provide compliance with required emission regulations on T444E, and ISM11-305.
- Vehicle Integration: Demonstrate suitable design and installation on selected vehicle platforms.
- Demonstrate CIS emission and vehicle performance in-use field testing.

Dual Fuel Conversions–NYSDOT Market



NYSDOT ISM305/444E

Population of Vehicles

- Only includes those from 1998-2001
- Four Vehicle Platforms
- Ten NYSDOT Regions

Dual Fuel Project Status

- EPA Waiver approved.

(T444E, ISM11, Isuzu 4.75 ISN)

- CARB underway.
- NYSDOT Vehicle in Rome for integration.
- NYS Grant approved to subsidize the initial seven vehicles.

NYS LNG Program

- **2001 – NYSERDA C/N 6641**

\$125,000 Initial feasibility study to assess current status in NY, identify potential stakeholders, and liquefaction technologies.



- **2002 – NYSERDA C/N 7084**

\$1,500,000 Comprehensive project to address LNG regulatory issues, site, permit, and complete the preliminary engineering design for an integrated L/CNG facility.



NYS LNG Steering Committee

Regulations and Legislation Subcommittee

Dual Track

**Technical consultant
has been retained to:**

- 1.) Assist NYSDEC
in the Rulemaking
Process, and**
- 2.) To draft new
Legislation updating
Article 23, Title 17**

Outreach and Guidelines Subcommittee

**Working with existing
equipment vendors
and numerous state
and local Fire Depts.
to develop Guidelines
for the safe permitting
and use of LNG
fueling stations and
other small scale
applications.**

LNG Technology Subcommittee

**Researching various
technology options
for LNG production
as a function of:**

- 1.) gas quality**
- 2.) gas quantity**
- 3.) gas pressure**
- 4.) distance to an
existing pipeline**

NYS LNG Program – Progress To Date

- **NYSDEC Regulations are being drafted. (est. 16 mo. process)**
- **New LNG Legislation passed the Senate in 2002 (S781) and again in 2003 (S885A), but has yet to pass the Assembly. It has been updated and it will be reintroduced in 2004.**
- **LNG Safety Guidelines are finished and ready for publishing.**
- **Technology partners have been identified and are developing implementation teams.**
- **NYSDOT 's fleet and infrastructure needs have been factored into the deployment strategy.**





For More Information: www.nyserda.org

